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SPECIFICATION FOR DRAFTING MACHINES

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2 *January* 1971

Indian Standard

SPECIFICATION FOR DRAFTING MACHINES

(First Revision)

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(*Continued on page* 2)

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lamp may be provided on the drafting unit. Drafting unit for vertical operation should be suitably conterbalanced.

2.2 Drawing Board — The drawing board shall conform to the requirements and sizes as specified in IS : 1444-1963*.

2.2.1 Where agreed to between the manufacturer and the purchaser the drawing boards of sizes other than those specified in IS : 1444-1963* may be fitted on the drafting machines.

2.3 Protractor Head — The knob of the protractor head should be of light but durable material having shape to suit the grip of the operator. Provision of shallow slots on the sides of the top portion may be useful to grip and operate conveniently.

2.3.1 The protractor head disc should have graduations engine divided at least from 0° to 60° anticlockwise and 0° to 90° clockwise on either side of the zero. A sliding vernier attachment and a locking arrangement should be provided around the top edge of the protractor head disc. The vernier shall read up to 15 minutes. Provision for quick shifting and automatically locking in position for angles at an interval of 15°, advancing on either side of the 0° shall be made. There should also be an arrangement for locking the arm carrying the scales at any intermediate position.

2.3.2 Alternate to the protractor head described in **2.3.1** the adjustable zero type protractor head shall have minimum angular movement of 45° on either side of the horizontal position. Provision for quick shifting and automatically locking at an interval of 15° advancing on either side of 0° shall be made. There should be also an arrangement for locking the head at any intermediate position.

2.3.3 The protractor head shall have a right-angled attachment to accept scales to be secured rigidly in position so that the scales thus set up should give an angle of 90°. This attachment or the protractor head should also be adjustable to a minimum of 3° so that the user may adjust scales to suit existing lines on the drawing accurately without the necessity of shifting the drawing paper.

2.4 Scales — The scales to be used with the drafting machine shall conform to the requirements and sizes as specified in IS : 1482-1970†. Scales with any two scale ratios specified in IS : 1482-1970† shall form part of a drafting machine.

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*Specification for engineers pattern drawing boards (*revised*).

†Specification for metric scales for use with drafting machines (*first revision*).

2.4.1 The scales when fixed with the drafting machine shall have a provision for adjustment to bring the angle between the two scales to 90°.

NOTE — However, scales with non-metric graduations may be used, as per specifications of the foreign buyer, when the machines are manufactured for export.

3. STAND

3.1 Drawing board is required to be held on a suitable stand capable of both vertical and angular movements and should be such that any part of the drawing board may be conveniently reached by the draughtsman. There should be safe locking and unlocking mechanism for holding the board in any desired position. The weight of the drawing board should be counterbalanced by a weight or by spring or any other means so as not to require more pressure than that exerted *by a mass of* 5 *kg* to be applied to the board for adjusting its position.

3.1.1 The height of the drawing board (when mounted on the adjustable stand) from floor level when brought to its lowest horizontal or near horizontal position shall be between 85 cm to 115 cm at the front and rear ends. The height at the rear ends should be equal or more than that at the front end. The front end of the board should have a minimum lift of 30 cm.

4. MATERIAL

4.1 The material used for the construction of the drafting unit may be a suitable aluminium alloy. For other parts mild steel, cast iron or any suitable material may be used.

5. FINISH

5.1 All parts shall have smooth surfaces and shall be suitably finished to prevent rusting and corrosion.

6. ACCURACY

6.1 The drafting unit shall pass the accuracy tests described in Appendix A. The accuracy of the drawing board shall be checked after mounting the board on the drafting machine.

7. MARKING

7.1 The nominal size of the drawing board with the manufacturer's name or trade-mark shall be marked at a suitable place.

7.1.1 The drafting machine may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8. PACKING

8.1 The drafting unit, scales, drawing board and stand shall be packed separately in a wooden box.

8.1.1 The counterweight, if forming a part of the drafting machine, shall be preferably packed separately. If packed together with the machine, proper securing arrangements should be incorporated so as not to cause any damage in transit.

APPENDIX A

(*Clause* 6.1)

METHOD OF TEST FOR ACCURACY OF THF DRAFTING UNIT

A-1. TEST FOR PROTRACTOR HEAD

A-1.1 A horizontal line AB is drawn by the drafting unit with the vertical scale adjusted to 90°. Lines originating from a point O on AB are drawn geometrically at 15° intervals independently of the protractor head as shown in Fig. 1. An arc of 300 mm radius is drawn with centre at O intersecting the above lines at C, D, E, F, G and H. The protractor head is now indexed to corresponding angles and lines drawn above are checked with vertical and horizontal scales of the drafting unit. The maximum deviation permitted from the lines shall not exceed 0·5 mm on either side as shown in Fig. 1.

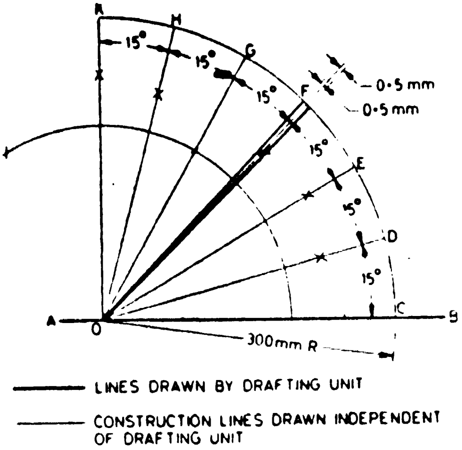

H
G
F
E
D
C
B
A
O
15°
15°
15°
15°
15°
15°
0·5 mm
0·5 mm
300mm R
LINES DRAWN BY DRAFTING UNIT
CONSTRUCTION LINES DRAWN INDEPENDENT OF DRAFTING UNIT

FIG. 1 TEST FOR ANGULAR ACCURACY

A-2. TESTS FOR OUT OF STRAIGHTNESS AND OUT OF PARALLELISM

A-2.1 Deviation in Straightness — Horizontal line drawn by the drafting unit are to be compared with a fine taut wire. The total deviation for drawing board length shall be as given below (*see* Fig. 2):

Up to 1 m	0·5 mm
Over 1 m and up to 2 m	1·0 mm
Over 2 m and up to 4 m	1·5 mm
Over 4 m	2 mm

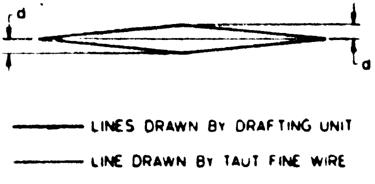
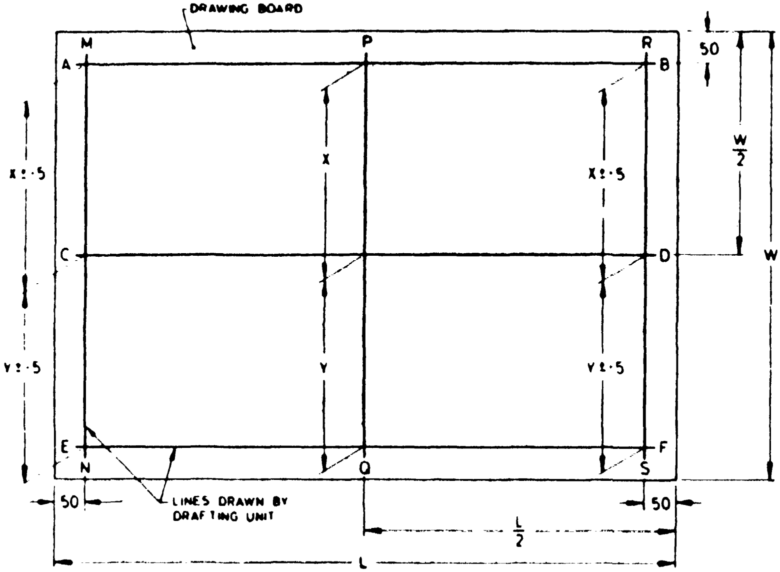


FIG. 2 TEST FOR STRAIGHTNESS ACCURACY

A-2.2 Out of Parallelism Test – Horizontal lines *AB*, *CD* and *EF* are drawn by the drafting unit as indicated in Fig. 3. The vertical scale is adjusted to 90° and vertical lines *MN*, *PQ* and *RS* are drawn as indicated. The distance *X* and *Y* are measured and compared with corresponding sides of the rectangle. A maximum deviation of ± 0·5 mm is permitted on corresponding dimensions of *X* and *Y*.



L = Length of drawing board.
W = Width of drawing board.

All dimensions in millimetres.

FIG. 3 TEST FOR PARALLELISM

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